

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	"Gut health" and the microbiome in the popular press: A content analysis
AUTHORS	Marcon, Alessandro; Turvey, Stuart; Caulfield, Timothy

VERSION 1 – REVIEW

REVIEWER	Casino, Gonzalo Pompeu Fabra University, Communication
REVIEW RETURNED	13-May-2021

GENERAL COMMENTS	<p>The article takes a rigorous approach to an interesting topic. It provides new and relevant data to understand how the relationship between the microbiome and health is reflected in the lay press; it also provides insights into the responsibility of journalists and scientists in communicating the evidence of microbiome and related health interventions.</p> <p>In my opinion, the research is well defined, has clear and relevant objectives, and follows appropriate and well-described methods to ensure replication; the presentation of the results and their interpretation, as well as the discussion of findings and the limitations of the research, seem broadly correct.</p> <p>Nevertheless, I hereby present some comments to improve the presentation of the research:</p> <p>1) Title. There is room for improvement. Mentioning only the American and Canadian press is not accurate enough, as over half (53.4%) of the sample of news items analysed are from British newspapers.</p> <p>2) Introduction. Although clear, synthetic and quite correct, I believe it lacks a recent and relevant reference to coverage of microbiome in the lay press: "Microbiome research in general and business newspapers: How many microbiome articles are published and which study designs make the news the most?" (https://doi.org/10.1371/journal.pone.0249835), which analyses a broad period (2007-2019) and provides data on the overrepresentation of observational studies and underrepresentation of clinical trials and systematic reviews in the news. Further information and references to systematic reviews on probiotic interventions could also be included, specifically those that have shown some effects such as "Probiotics for the prevention of paediatric antibiotic-associated diarrhoea" (https://doi.org/10.1002/14651858.CD004827.pub5).</p>
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	<p>3) Methods. I believe this section lacks further details about the "popular source list" of newspapers analysed. The complete could also be added as Supplementary Materials (not just an image of the Factiva search). When justifying the timeframe selection, it sounds contradictory to state «the topics of "microbiome" and "gut health" had been steadily receiving media attention from 2010 onwards with no apparent deviations» whilst there are data showing the increase in press coverage within this decade –as stated in the introduction. As a final suggestion, removing the adverb "rigorously" could be considered (p5, line15).</p> <p>4) Results. This is the section that, from my point of view, could be improved the most. The description of the results could be more concise and better structured. Regarding tables and figures, table 1 is missing and figures 2 and 3 are not numbered. Information in tables 2 and 3 does not seem sufficiently different from the (supposedly) figures 2 and 3 to justify two types of presenting results.</p> <p>On the other hand, I miss some data about specific newspapers, to see the differences between them. When reading the results some questions emerge: Are there any differences between articles in the American, Canadian and British press? Is the microbiome hype present in all newspapers? Which newspapers exaggerate the most? Certainly, these are not the aims of this research, but perhaps providing some data could be considered.</p> <p>5) Discussion and limitations. In this section, it could be considered recalling those microbiome or probiotics interventions supported by evidence (specifically those in which certainty of evidence is greater than low), and noting that the observed microbiome hype may not exist in news items about such interventions. Furthermore, if differences between individual newspapers have not been analysed, it could be noted that the general results may not apply to individual newspapers.</p>
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REVIEWER	Grant, George University of Aberdeen, School of Medicine, Medical Sciences and Nutrition
REVIEW RETURNED	30-May-2021

GENERAL COMMENTS	<p>This is a thorough and well-researched review of how the microbiome and human health is portrayed in the popular press. It should make salutary reading for scientists and clinicians in this field. Two statements from the text readily highlight the good and the bad effects of the reporting of the subject.</p> <p>Pg 10 In 28-30 'The overall portrayal of the microbiome science appears to be either oversimplified or greatly exaggerated, serving instead as a means to promote and validate the lifestyle ideas and products contained in the articles.'</p> <p>Pg 10 In 35-40 'Further, in cases where a critique was evident, nearly half portrayed limitations to the microbiome as being simply a case of preliminary research, which may or may not influence how the diverse readership of the popular press interpret the realistic state of the scientific developments. Specifically, it may give a false impression of a potential applications' readiness, for example, in cases of the microbiome's influence on autism or mental health.'</p>
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	<p>Highlighting the microbiome, its links to well-being and health and the influences of diet and lifestyle upon it are important messages to convey to the public. However, oversimplification of the present knowledge about the microbiome and hype of the possibilities of modulating it to limit disease and promote health has great risks in the absence of clear-cut incontrovertible examples of beneficial effects of a treatment or product upon specific groups of the population. 1) There is a danger that the microbiome becomes seen as being the cause and excuse for all illness, and focus being diverted from other more practical reasons and remedies. 2) Failure to show actual short- or long-term benefits may lead to burnout and loss of trust and acceptance by consumers. 3) Diversion of funding from non-microbiome approaches to investigate and treat diseases.</p> <p>The authors have thoroughly overviewed the microbiome as described by the popular press.</p> <p>Pg 5 In 21 Probiotic & probiotics included. Why no inclusion of prebiotics?</p> <p>Pg 8 In 14-19 Literature often seems exclusively supportive of natural childbirth and breastfeeding without acknowledging that in many cases caesarean section and bottle feeding may be the only options.</p> <p>Pg 8 In 19-23 It is easy for the literature to demonise antibiotics. They can cause long-term problems particularly if given to the young, but it must not be forgotten that they are being administered to treat serious infections which can cause death. In that circumstance, the medics first option must be to deal with the immediate problems rather than potential long-term issues.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer Reports:

Reviewer: 1

Dr. Gonzalo Casino, Pompeu Fabra University

Comments to the Author:

The article takes a rigorous approach to an interesting topic. It provides new and relevant data to understand how the relationship between the microbiome and health is reflected in the lay press; it also provides insights into the responsibility of journalists and scientists in communicating the evidence of microbiome and related health interventions.

In my opinion, the research is well defined, has clear and relevant objectives, and follows appropriate and well-described methods to ensure replication; the presentation of the results and their interpretation, as well as the discussion of findings and the limitations of the research, seem broadly correct.

Nevertheless, I hereby present some comments to improve the presentation of the research:

1) **Title**. There is room for improvement. Mentioning only the American and Canadian press is

not accurate enough, as over half (53.4%) of the sample of news items analysed are from British newspapers.

Response: We agree with this critique. We are changing the title to: “Gut health” and the microbiome in the popular press: A content analysis

2) **Introduction**. Although clear, synthetic and quite correct, I believe it lacks a recent and relevant reference to coverage of microbiome in the lay press: "Microbiome research in general and business newspapers: How many microbiome articles are published and which study designs make the news the most?" (<https://doi.org/10.1371/journal.pone.0249835>), which analyses a broad period (2007-2019) and provides data on the overrepresentation of observational studies and underrepresentation of clinical trials and systematic reviews in the news. Further information and references to systematic reviews on probiotic interventions could also be included, specifically those that have shown some effects such as "Probiotics for the prevention of paediatric antibiotic-associated diarrhoea" <https://doi.org/10.1002/14651858.CD004827.pub5>).

Response: We appreciate this feedback and have included both of these references in the introduction.

The following sentence has been included for the first study:

“Further media research has indicated that microbiome coverage tends to focus on observational studies with less coverage given to clinical trials and systematic reviews.”

The following sentence has been modified to include the second study:

“In particular, while research has indicated benefits for the use of probiotics in the context of paediatric antibiotic-associated diarrhea, critiques have also been raised about the exaggerated benefits attributed to probiotics.”

3) **Methods**. I believe this section lacks further details about the "popular source list" of newspapers analysed. The complete could also be added as Supplementary Materials (not just an image of the Factiva search). When justifying the timeframe selection, it sounds contradictory to state «the topics of "microbiome" and "gut health" had been steadily receiving media attention from 2010 onwards with no apparent deviations» whilst there are data showing the increase in press coverage within this decade –as stated in the introduction. As a final suggestion, removing the adverb "rigorously" could be considered (p5, line15).

Response: We have added the specific list of the sources and counts to the Supplementary Materials. Regarding the phrasing around the timeframe, we have included the word “increasingly” to address the concern. That sentence now reads:

“The timeframe was selected as it was observed through FACTIVA searches and analysis on google trends that the topics of “microbiome” and “gut health” had been steadily and increasingly receiving media attention from 2010 onwards with no apparent deviations.”

We agree with the editing suggestion and have removed “rigorously” from the document.

4) **Results**. This is the section that, from my point of view, could be improved the most. The description of the results could be more concise and better structured. Regarding tables and figures, table 1 is missing and figures 2 and 3 are not numbered. Information in tables 2 and 3 does not seem sufficiently different from the (supposedly) figures 2 and 3 to justify two types of presenting results.

Response: We have corrected the typos and labeling issues. Thank you. If the editors of the journal decide that Figures 2 or 3 do not add any value, we are fine to remove them. We will leave that decision to the editors.

On the other hand, I miss some data about specific newspapers, to see the differences between them. When reading the results some questions emerge: Are there any differences between articles in the American, Canadian and British press? Is the microbiome hype present in all newspapers? Which newspapers exaggerate the most? Certainly, these are not the aims of this research, but perhaps providing some data could be considered.

Response: We appreciate this line of inquiry but as noted, “this was not the aim of the research.” Our objective was not focus on the representations of different media sources but rather the overall portrayal of the microbiome and the specific characteristics of that portrayal: how often portrayed as beneficial, beneficial for which ailments, and beneficial through which actions. Certainly we would be interested in reading research that shed lights on the portrayals from difference sources and may even consider conducting that study ourselves in the future.

5) **Discussion and limitations**. In this section, it could be considered recalling those microbiome or probiotics interventions supported by evidence (specifically those in which certainty of evidence is greater than low), and noting that the observed microbiome hype may not exist in news items about such interventions. Furthermore, if differences between individual newspapers have not been analysed, it could be noted that the general results may not apply to individual newspapers.

Response: We have modified the following two sentences in the discussion and limitations sections:

In the discussion:

“Most often, the benefits of a “healthy gut” are simply presented as a given. Certain foods (e.g., yogurt, kombucha) and particular practices (e.g., taking probiotics) are presented as being beneficial to “gut health,” though typically no details are provided (e.g. research showing benefit in some contexts^{Error! Bookmark not defined.}) about why this is so or what the particular health benefits might be.”

In the limitations: “Future research could replicate this study in other regions to see whether the same trend persists or whether some press sources, in some contexts, portray the microbiome in significantly different manners.”

Reviewer: 2

Dr. George Grant, University of Aberdeen

Comments to the Author:

This is a thorough and well-researched review of how the microbiome and human health is portrayed in the popular press. It should make salutary reading for scientists and clinicians in this field. Two statements from the text readily highlight the good and the bad effects of the reporting of the subject.

Pg 10 In 28-30 'The overall portrayal of the microbiome science appears to be either oversimplified or greatly exaggerated, serving instead as a means to promote and validate the lifestyle ideas and products contained in the articles.'

Pg 10 In 35-40 'Further, in cases where a critique was evident, nearly half portrayed limitations to the microbiome as being simply a case of preliminary research, which may or may not influence how the diverse readership of the popular press interpret the realistic state of the scientific developments. Specifically, it may give a false impression of a potential applications' readiness, for example, in cases of the microbiome's influence on autism or mental health.'

Highlighting the microbiome, its links to well-being and health and the influences of diet and lifestyle upon it are important messages to convey to the public. However, oversimplification of the present knowledge about the microbiome and hype of the possibilities of modulating it to limit disease and promote health has great risks in the absence of clear-cut incontrovertible examples of beneficial effects of a treatment or product upon specific groups of the population. 1) There is a danger that the microbiome becomes seen as being the cause and excuse for all illness, and focus being diverted from other more practical reasons and remedies. 2) Failure to show actual short- or long-term benefits may lead to burnout and loss of trust and acceptance by consumers. 3) Diversion of funding from non-microbiome approaches to investigate and treat diseases.

The authors have thoroughly overviewed the microbiome as described by the popular press.

Pg 5 In 21 Probiotic & probiotics included. Why no inclusion of prebiotics?

Response: In our process of determining the relevant search terms used in popular discourse in the popular press, we did see a large "prebiotic" presence appear in Google trends (online discourse). This media attention did not transfer, however, to the discourse of popular media sources (newspaper companies), on which our study was based. The terms "prebiotic" had a very marginal presence compared to "probiotic", and a much lower presence compared to the other search terms. Further analysis showed that when combined with the other search terms in an overall search, "prebiotics" produced only a scant amount of additional articles (approx. 50 out of 1900). For that reason it was determined to omit "prebiotics" from the final search inquiry along with some other more peripheral terms such as "fecal transplants."

Pg 8 In 14-19 Literature often seems exclusively supportive of natural childbirth and breastfeeding without acknowledging that in many cases caesarean section and bottle feeding may be the only options.

Response: Yes, we agree with this comment that this portrayal of natural childbirth and breastfeeding can be problematic. We are aware of the complex messaging that goes into promoting the benefits of breastfeeding, particularly its impact on women who cannot do so.

Pg 8 In 19-23 It is easy for the literature to demonise antibiotics. They can cause long-term problems particularly if given to the young, but it must not be forgotten that they are being administered to treat

serious infections which can cause death. In that circumstance, the medics first option must be to deal with the immediate problems rather than potential long-term issues.

Response: We agree with this comment as well. It was an interesting finding for us to see the popular press focus on the harms of antibiotics without providing a great deal of nuance.

VERSION 2 – REVIEW

REVIEWER	Grant, George University of Aberdeen, School of Medicine, Medical Sciences and Nutrition
REVIEW RETURNED	12-Jul-2021
GENERAL COMMENTS	The queries raised have been addressed in a satisfactory manner.